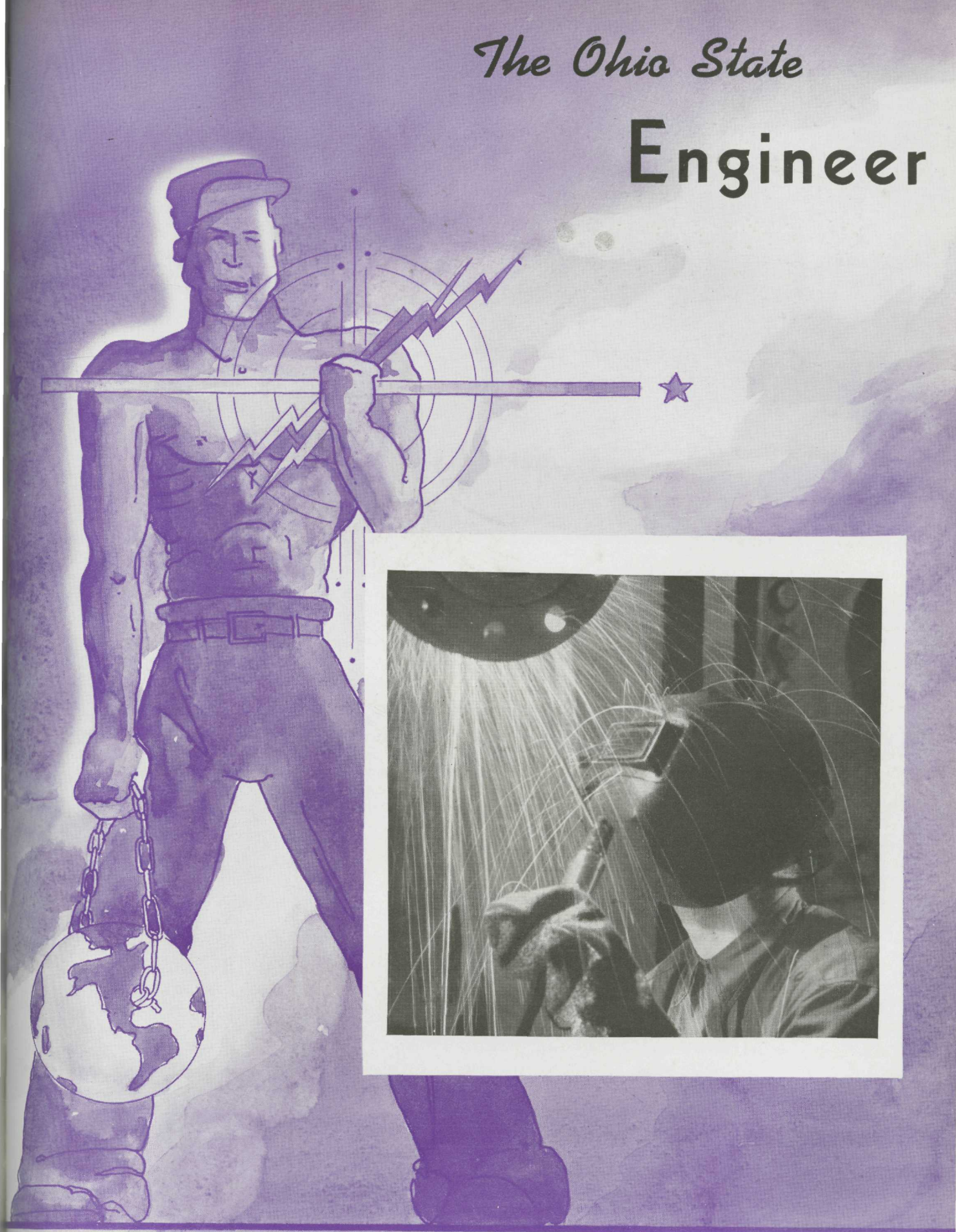
The Ohio State Engineer



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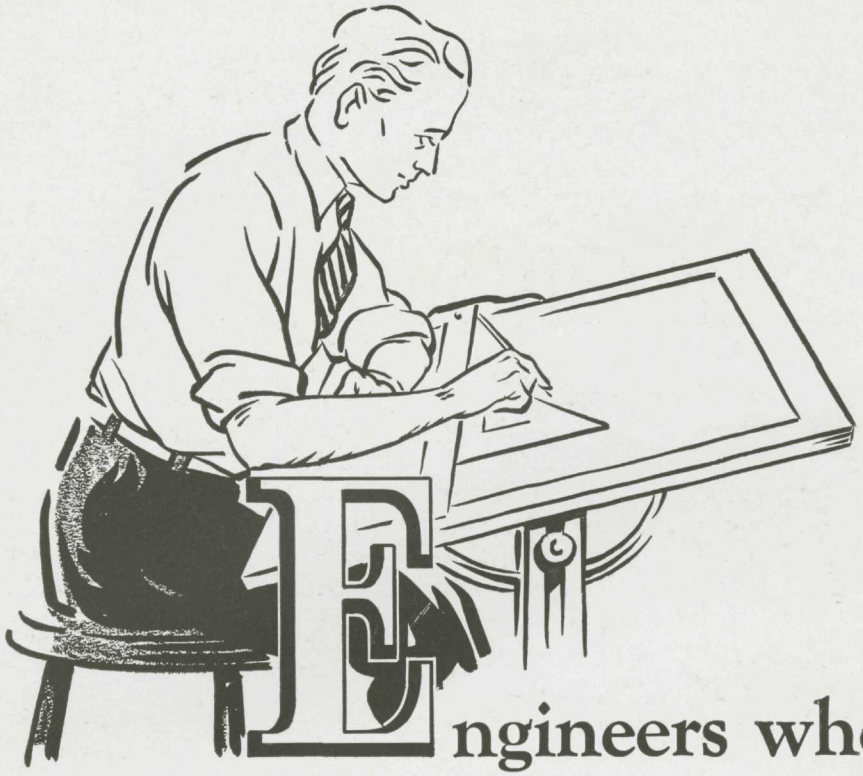


Engineers who know their bearings are helping to win the war

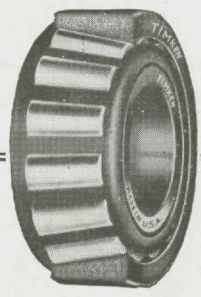
Timken Tapered Roller Bearings in untold millions have gone and constantly are going into American fighting equipment and the industrial machines that produce it—placed there by engineers who know from years of experience what Timken Bearings can do.

Many of these veteran engineers began to acquire their knowledge of Timken Bearings while in college, and if you asked them they would tell you that this has been an important factor in their success.

For there is no bearing problem, however complex, that cannot be solved by the multiple abilities of Timken Bearings — the total elimination of friction; the safe carrying of radial, thrust and combined loads; and the holding of moving parts in correct and constant alignment.

Begin now to obtain *your* knowledge of Timken Bearings.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

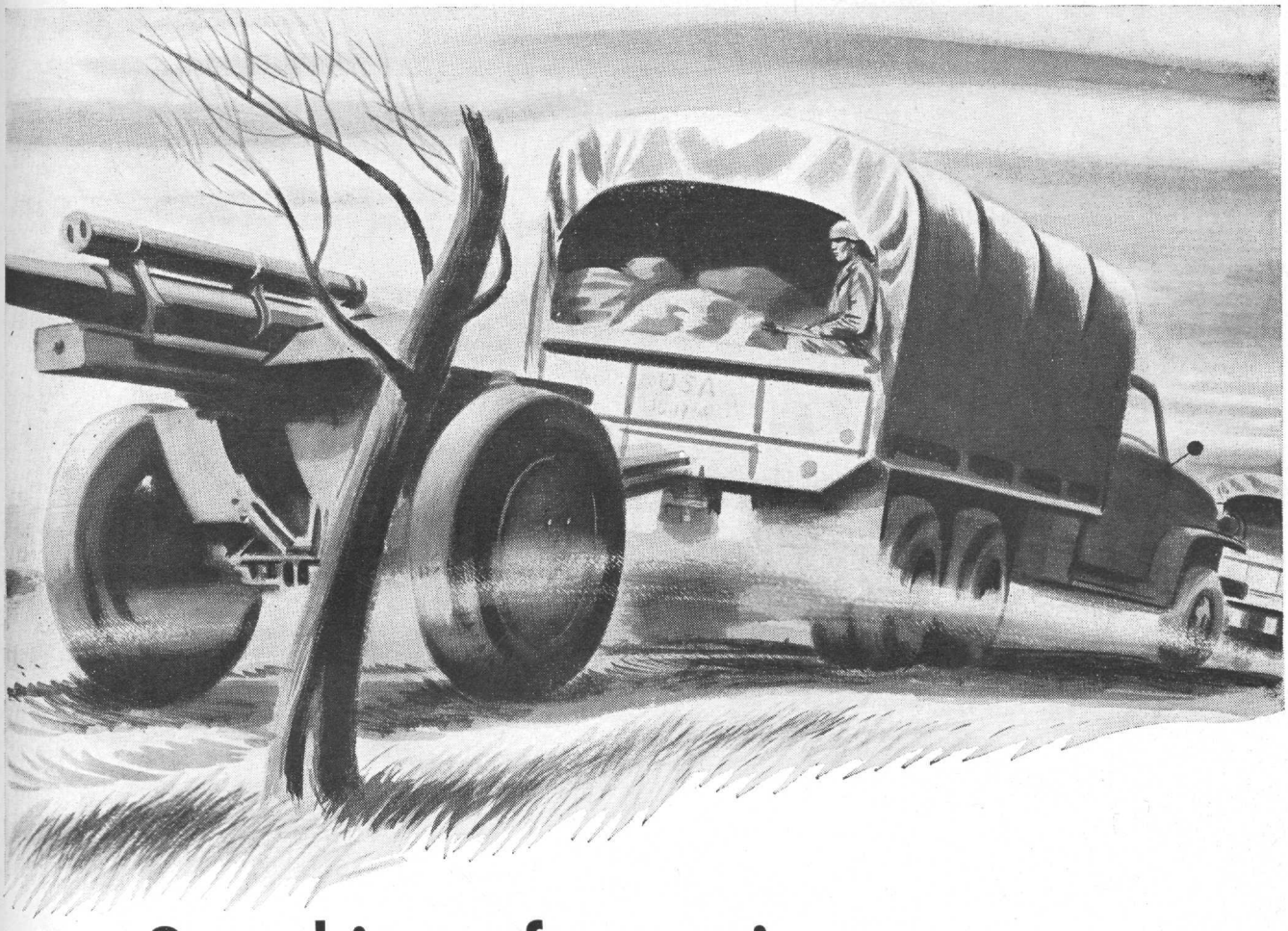


TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

"ALL THERE IS IN BEARINGS"



Speaking of superior races . . .

Every wheel that rolls on the battlefield turns in a polished bearing race, ruggedly built to take the terrific shock of combat service.

To withstand such punishment, bearing races must be hardened by heat-treatment. Hard and soft spots occasionally occur. Such races may fail—at times when failure means disaster.

Recognizing the vital need, Westinghouse Research Engineers P. H. Brace and C. S. Williams set to work to develop a quick, sure method of detecting these flaws.

Their ingenious electromagnetic flaw-detector is based upon the fundamental law that the *permeability* of a heat-treated steel part varies with the degree of hardness.

In actual practice, Brace and Williams first *completely* demagnetize the bearing race under test. Next it is rapidly rotated and strongly magnetized. While the race is still turning at high speed its magnetic field is explored with a specially designed electromagnetic "pick-up."

Variations in the magnetic field of the bearing race, due to hard or soft spots, induce feeble currents in the pick-up system. These currents are amplified and shown on a cathode-ray oscilloscope.

A uniformly heat-treated bearing race traces a *luminous straight line* on the oscilloscope screen. Faulty heat-treating shows up as a pattern of *hills and valleys.*

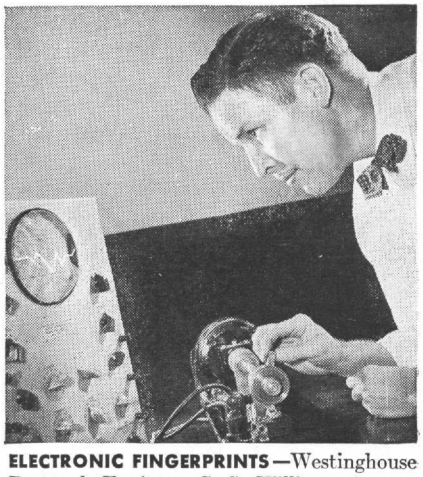
The Brace-Williams electromagnetic flaw-detector is now being used commercially—a typical example of Westinghouse *electronics at work.* It assures quality in millions of bearing races for our armed forces, *to keep 'em rolling on to victory!*

★ ★ ★

What Brace and Williams did—by employing Westinghouse "know how" to develop the magnetic flaw detector—many young Westinghouse scientists are now doing in other fields of fundamental research.

Today, they are helping to solve the technical problems of modern warfare. Tomorrow, they will tackle the job of building a better world for all of us.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pennsylvania.



ELECTRONIC FINGERPRINTS—Westinghouse Research Engineer C. S. Williams demonstrates the principle of the electromagnetic flaw-detector. Hard spots in the steel test piece show up as an irregular line on the oscilloscope screen. Williams joined Westinghouse after receiving his B. S. in Electrical Engineering at Northwestern University.

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

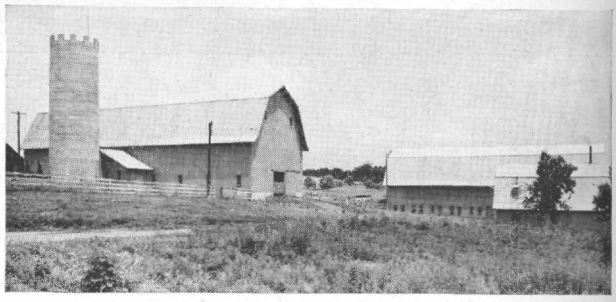
Electronics at work

Combining PATRIOTISM *and* GOOD SENSE

Of course every one is willing to do without the essential materials that help win the war; everybody knows zinc and steel are among those materials. And *of course* it is just good common sense to take care of the things we have, including galvanized roofing, to make them last as long as possible and give the best service.

HOW TO CONSERVE GALVANIZED ROOFING

You'll find galvanized roofing of various types used on all kinds of structures, on farms, in industrial plants, in housing. It is a valuable material, and with proper care it can be made to last a long, long time; anyhow, until the war is over and necessary replacement material is available.



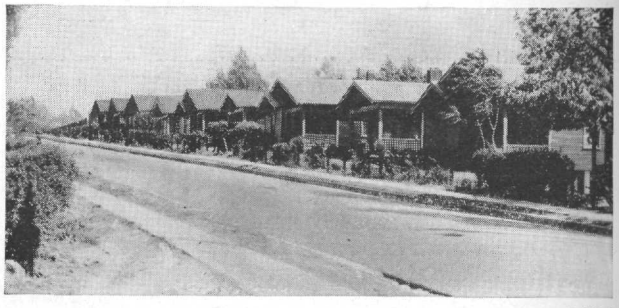
Galvanized sheets constitute one of the most popular forms of roofing for farm buildings of all kinds. Everything considered, they are also the most economical.

Do This . . .

See that all the roof supports are in good shape. If necessary renail and strengthen them, and replace broken or rotted members.

And This . . .

Then bring all the separate sheets into as close alignment as possible. If moisture has a tendency to creep through at the laps, lay a strand of asbestos wicking between the sheets at the laps, and renail the roofing with an approved type of zinc-coated lead-seal special roofing nail with a drive-screw shank. Stubborn lap openings can be effectively closed with hardware screws.

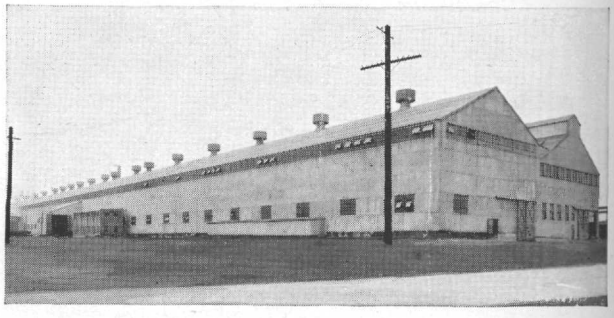


In industrial establishments, where efficiency and economy of materials are of prime importance, galvanized sheets are widely used for various types of structures, from modest homes for employees to the largest of manufacturing plants.

And This . . .

If any of the roofing is showing signs of rusting, paint it with two coats of metallic zinc paint, (see Federal Specifications TT-P-641) which will effectively stop the rust and prevent further injury to the roofing. In fact, the use of this remarkably good paint, which can be readily made by any paint manufacturer, will extend the life of galvanized roofing almost indefinitely.

In "How To Make Galvanized Roofing Last Longer", a booklet published by the Institute, complete and explicit directions are given for all of the above operations. Copies will be sent free upon request.



AMERICAN ZINC INSTITUTE
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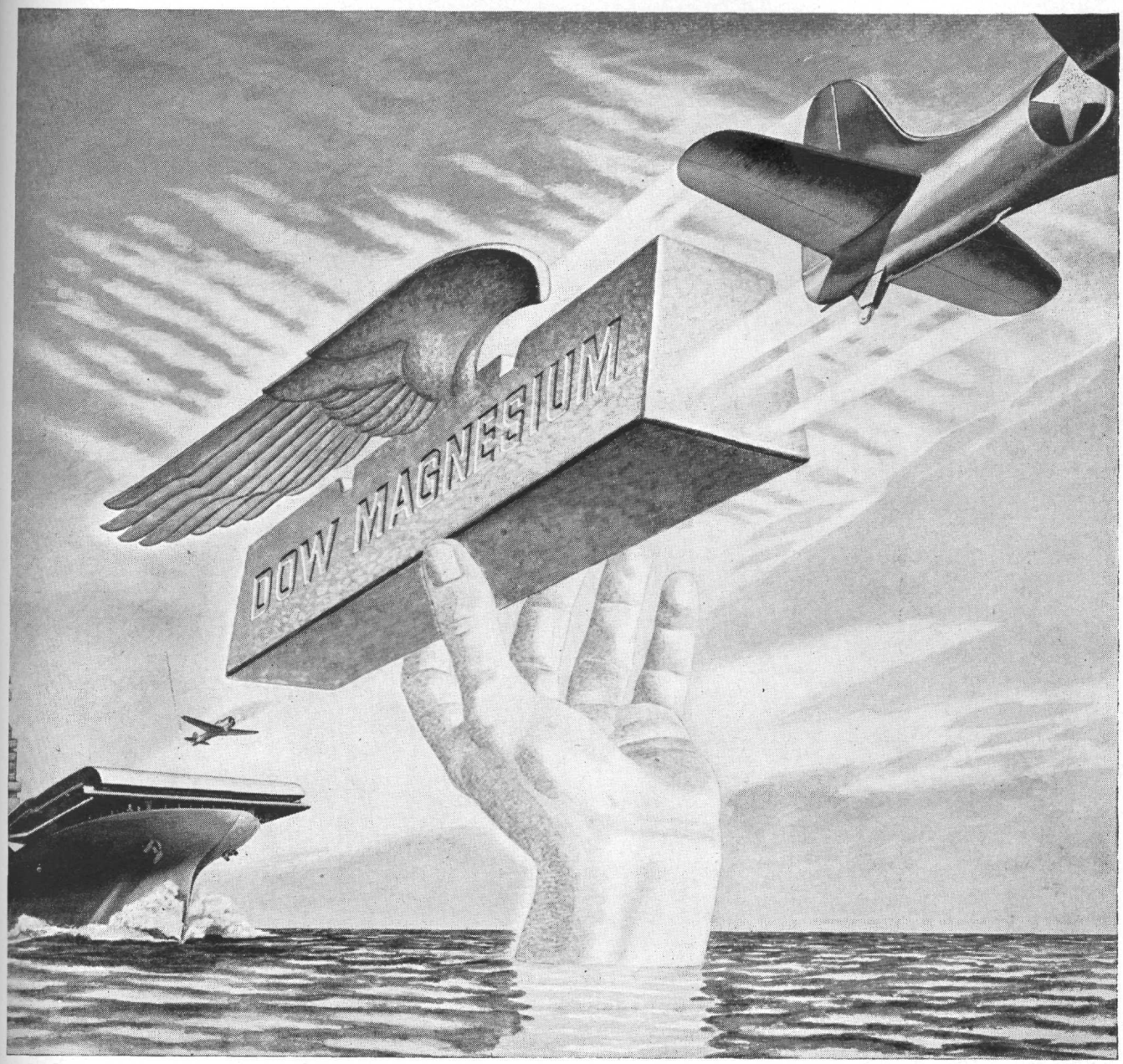


THE WINGED INGOT is a symbol of freedom. It is a graphic expression of Dow's recovery of magnesium, lightest of the light metals, from sea water to release our airplanes from hampering weight.

Also, it is a symbol of things to come. When peace returns the freedom of American enterprise will permit the full use of Dow's vast magnesium production to speed transportation of passengers and freight by air and lighten tasks in industry, business and the home.

Millions of pounds of Dow magnesium, extracted from the inexhaustible sources of the sea and from Michigan brine—as well as Dow facilities already established for the fabrication of Dowmetal castings and wrought products—will then be available to give this symbol of freedom—the flying ingot—its fullest significance.

THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN

New York—St. Louis—Chicago—Houston—San Francisco—Los Angeles—Seattle

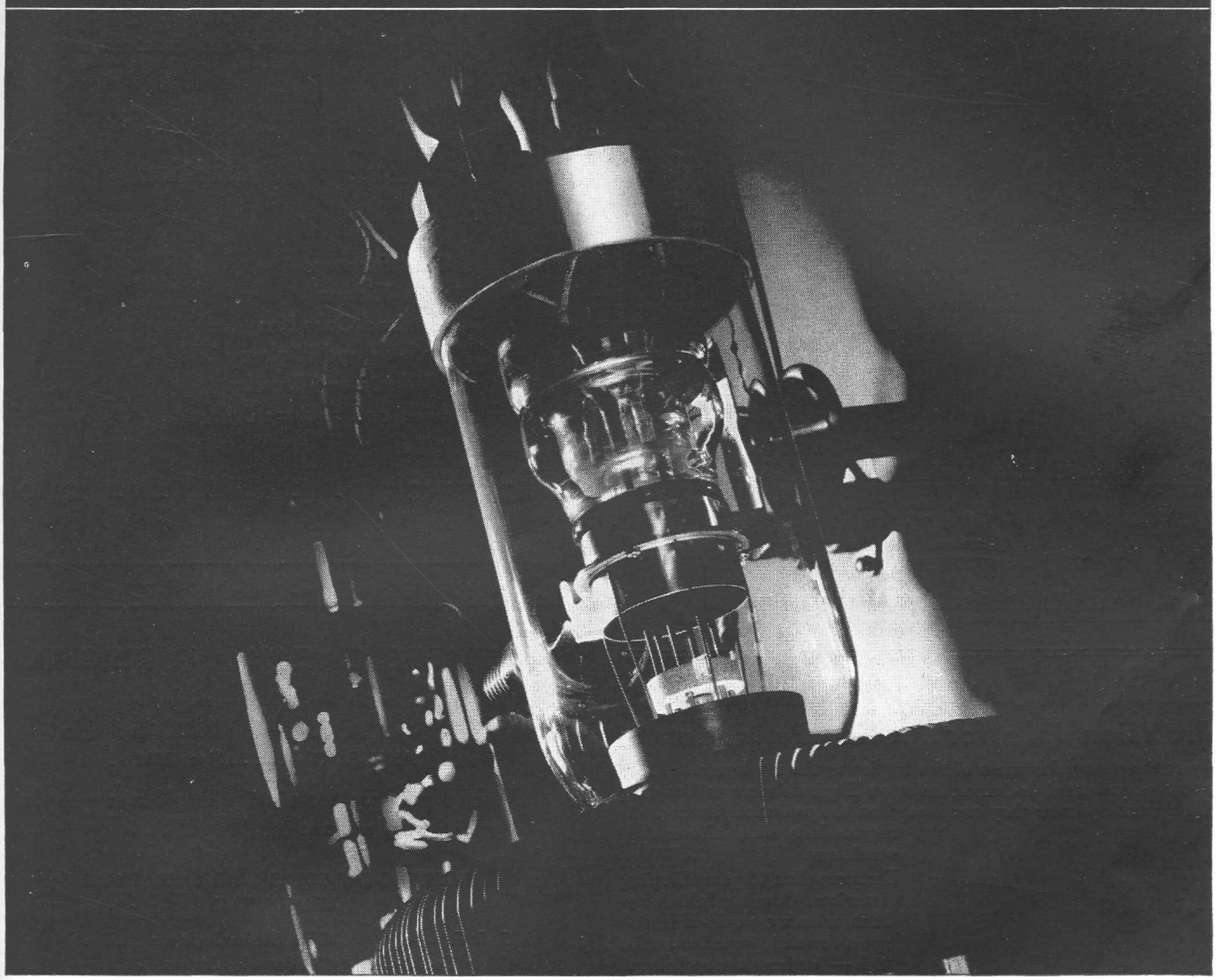
MAGNESIUM

PRODUCER SINCE 1916

DOW

CHEMICALS INDISPENSABLE TO INDUSTRY AND VICTORY

This is Fred Allen's horse...



EVER wonder how Fred Allen manages to ride into millions of homes every week and emerge life-size and full-voiced from radio loud speakers?

The "horse" he rides is a big radio transmission tube like the one shown above. One reason it carries him smoothly and without interruption is that Corning research has perfected a glass for radio tubes that will stand heat and voltage of modern transmission.

Corning furnishes glass for the tubes in your own radio set, too. Just as it furnishes glass for many of your lamp bulbs; for the Pyrex cooking utensils in the kitchen back home. But to many, and particularly to the man who is making engineering his life work, Corning research is most interesting because of the things it has discovered that glass can do in competition with other materials, and do better. Glass springs, for instance, that apparently never tire out. Glass acid pumps that replace valuable metal alloys and give longer service in the bargain! Glass piping, and valves, nuts and bolts that resist chemical attack. Every day Corning is working on ways in which glass, still fairly plentiful, can be used to replace metals that are vital to war industry.

Glass is important today. And as more is discovered about this remarkable material, no one can predict the boundaries of its usefulness. For instance, glass precision gauges (ring, plug and others) are now being produced that are in many ways superior to ones made of steel.

As you get further into engineering, keep an eye on glass. The greatest things in glass are yet to come. Corning Glass Works, Corning, N. Y.

CORNING
means
Research in Glass

The OHIO STATE ENGINEER

Vol. XXVI | April, 1943 | No. 5

OUR COVER

New electrodes greatly increase the ease of overhead welding.

Courtesy General Electric

TABLE OF CONTENTS

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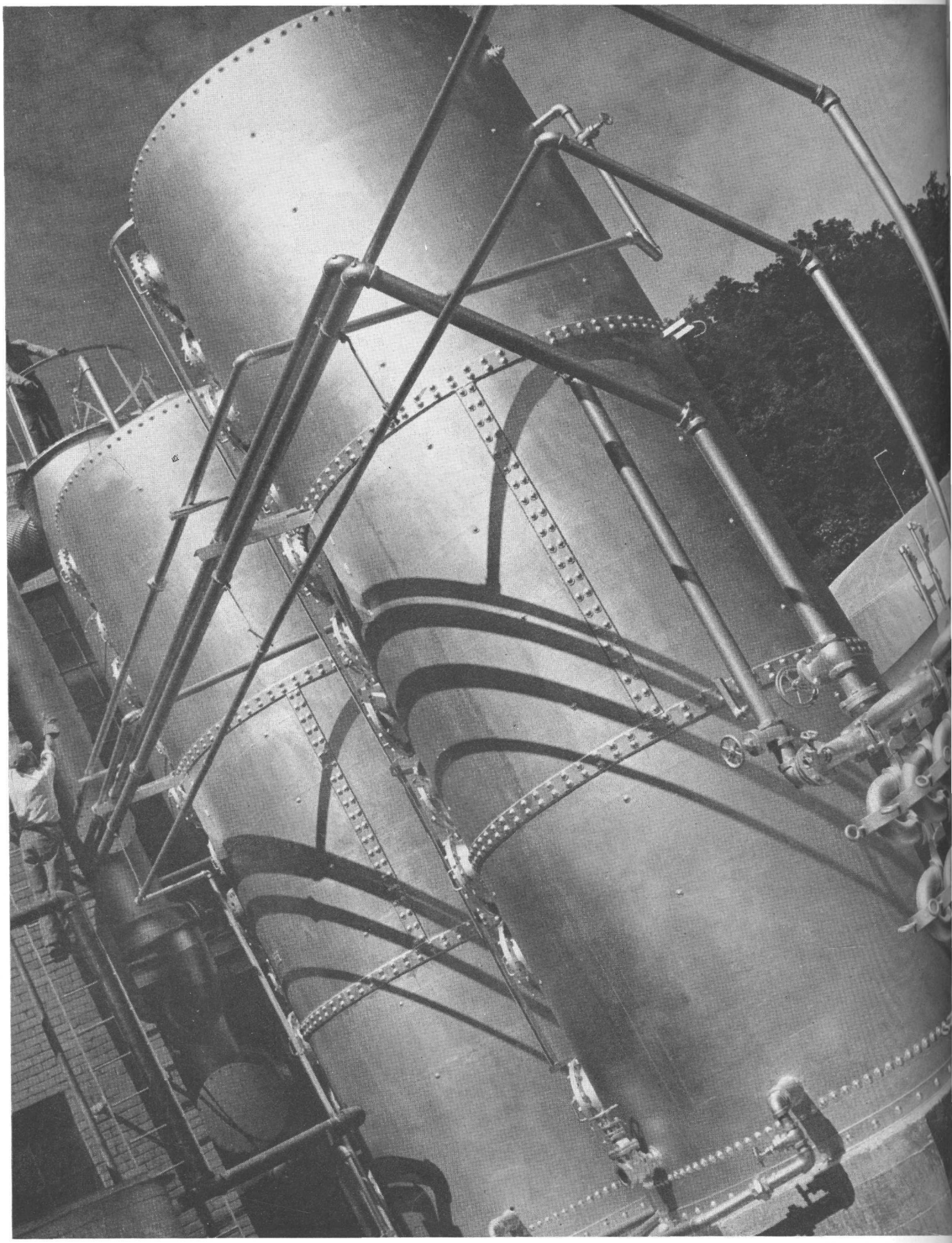

• Solvent funnels used to recover volatile fluids.

Courtesy Westinghouse Electric & Mfg. C